

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method of manufacturing a semiconductor device, comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure;
crystallizing the semiconductor film having an amorphous structure to form a semiconductor film having a crystalline structure;
selectively adding a rare gas element to the semiconductor film having a crystalline structure to form an impurity region;
gettering the metal element to the impurity region to selectively remove or reduce the metal element in the semiconductor film having a crystalline structure; and
removing the impurity region.

2. (Original) A method according to claim 1, wherein one kind or a plurality of kinds of elements selected from the group consisting of H, H₂, O, O₂, and P are added in addition to the rare gas element.

3. (Currently Amended) A method according to claim 1, wherein the step of selectively adding a rare gas element is conducted in an atmosphere containing a rare gas element and water vapor.

4. (Canceled)

5. (Original) A method according to claim 1, further comprising a step of oxidizing a surface of the semiconductor film having a crystalline structure with a solution containing ozone after the crystallizing.

6. (Original) A method according to claim 1, wherein the crystallizing is conducted by heat treatment.

7. (Original) A method according to claim 1, wherein the crystallizing is conducted by irradiation of the semiconductor film having an amorphous structure with strong light.

8. (Original) A method according to claim 7, wherein the strong light is emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, a carbon arc lamp, a high-pressure sodium lamp, and a high-pressure mercury lamp.

9. (Original) A method according to claim 1, wherein the crystallizing is conducted by heat treatment and irradiation of the semiconductor film having an amorphous structure with strong light.

10. (Original) A method according to claim 9, wherein the strong light is emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, a carbon arc lamp, a high-pressure sodium lamp, and a high-pressure mercury lamp.

11. (Original) A method according to claim 1, wherein the gettering is conducted by heat treatment.

12. (Original) A method according to claim 1, wherein the gettering is conducted by irradiation of the semiconductor film with strong light.

13. (Original) A method according to claim 12, wherein the strong light is emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, a carbon arc lamp, a high-pressure sodium lamp, and a high-pressure mercury lamp.

14. (Original) A method according to claim 1, wherein the gettering is conducted by heat treatment and irradiation of the semiconductor film with strong light.

15. (Original) A method according to claim 14, wherein the strong light is emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, a carbon arc lamp, a high-pressure sodium lamp, and a high-pressure mercury lamp.

16. (Currently Amended) [[A]] A method according to claim 1, wherein the metal element is one kind or a plurality of kinds of elements selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

17. (Currently Amended) A method according to claim 1, wherein the rare gas element is one kind or a plurality of kinds of elements selected from the group consisting of He, Ne, Ar, Kr, and Xe.

18. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

adding a metal element to a semiconductor film having an amorphous structure;

crystallizing the semiconductor film having an amorphous structure to form a semiconductor film having a crystalline structure;

forming a first mask on the semiconductor film having a crystalline structure;

selectively adding a rare gas element to the semiconductor film having a crystalline structure to form an impurity region;

gettering the metal element to the impurity region to selectively remove or reduce the metal element in the semiconductor film having a crystalline structure;

forming a second mask on the semiconductor film having a crystalline structure; and
selectively removing the semiconductor film.

19. (Currently Amended) A method according to claim 18, wherein the impurity region and a part of the semiconductor film having a crystalline structure are removed in the step of selectively removing the semiconductor film.

20. (Original) A method according to claim 18, wherein the second mask is provided at a position on an inner side of the ends of the first mask.

21. (Original) A method according to claim 18, wherein one kind or a plurality of kinds of elements selected from the group consisting of H, H₂, O, O₂, and P are added in addition to the rare gas element.

22. (Currently Amended) A method according to claim 18, wherein the step of selectively adding a rare gas element is conducted in an atmosphere containing a rare gas element and water vapor.

23. (Canceled)

24. (Original) A method according to claim 18, further comprising a step of oxidizing a surface of the semiconductor film having a crystalline structure with a solution containing ozone after the crystallizing.

25. (Original) A method according to claim 18, wherein the crystallizing is conducted by heat treatment.

26. (Original) A method according to claim 18, wherein the crystallizing is conducted by irradiation of the semiconductor film having an amorphous structure with strong light.

27. (Original) A method according to claim 26, wherein the strong light is emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, a carbon arc lamp, a high-pressure sodium lamp, and a high-pressure mercury lamp.

28. (Original) A method according to claim 18, wherein the crystallizing is conducted by heat treatment and irradiation of the semiconductor film having an amorphous structure with strong light.

29. (Original) A method according to claim 18, wherein the gettering is conducted by heat treatment.

30. (Original) A method according to claim 18, wherein the gettering is conducted by irradiation of the semiconductor film with strong light.

31. (Original) A method according to claim 30, wherein the strong light is emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a

xenon arc lamp, a carbon arc lamp, a high-pressure sodium lamp, and a high-pressure mercury lamp.

32. (Original) A method according to claim 18, wherein the gettering is conducted by heat treatment and irradiation of the semiconductor film with strong light.

33. (Currently Amended) [[A]] A method according to claim 18, wherein the metal element is one kind or a plurality of kinds of elements selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

34. (Currently Amended) A method according to claim 18, wherein the rare gas element is one kind or a plurality of kinds of elements selected from the group consisting of He, Ne, Ar, Kr, and Xe.

35. (Currently Amended) A method of manufacturing a semiconductor device comprising the steps of:

- forming a first mask on a semiconductor film having an amorphous structure;
- selectively adding a metal element to the semiconductor film having an amorphous structure;
- crystallizing the semiconductor film to form a semiconductor film having a crystalline structure;
- selectively adding a rare gas element to the semiconductor film having a crystalline structure to form an impurity region;
- gettering the metal element to the impurity region to selectively remove or reduce the metal element in the semiconductor film having a crystalline structure;
- forming a second mask on the semiconductor film having a crystalline structure; and
- selectively removing the semiconductor film.

36. (Currently Amended) A method according to claim 35, wherein the impurity region and a part of the semiconductor film having a crystalline structure are removed in the step of selectively removing the semiconductor film.

37. (Original) A method according to claim 35, wherein the second mask is provided at a position on an inner side of the ends of the first mask.

38. (Original) A method according to claim 35, wherein one kind or a plurality of kinds of elements selected from the group consisting of H, H₂, O, O₂, and P are added in addition to the rare gas element.

39. (Currently Amended) A method according to claim 35, wherein the step of selectively adding a rare gas element is conducted in an atmosphere containing a rare gas element and water vapor.

40. (Canceled)

41. (Original) A method according to claim 35, further comprising a step of oxidizing a surface of the semiconductor film having a crystalline structure with a solution containing ozone after the crystallizing.

42. (Original) A method according to claim 35, wherein the crystallizing is conducted by heat treatment.

43. (Original) A method according to claim 35, wherein the crystallizing is conducted by irradiation of the semiconductor film having an amorphous structure with strong light.

44. (Original) A method according to claim 43, wherein the strong light is emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, a carbon arc lamp, a high-pressure sodium lamp, and a high-pressure mercury lamp.

45. (Original) A method according to claim 35, wherein the crystallizing is conducted by heat treatment and irradiation of the semiconductor film having an amorphous structure with strong light.

46. (Original) A method according to claim 35, wherein the gettering is conducted by heat treatment.

47. (Original) A method according to claim 35, wherein the gettering is conducted by irradiation of the semiconductor film with strong light.

48. (Original) A method according to claim 47, wherein the strong light is emitted from a lamp selected from the group consisting of a halogen lamp, a metal halide lamp, a xenon arc lamp, a carbon arc lamp, a high-pressure sodium lamp, and a high-pressure mercury lamp.

49. (Original) A method according to claim 35, wherein the gettering is conducted by heat treatment and irradiation of the semiconductor film with strong light.

50. (Original) A method according to claim 35, wherein the metal element is one kind or a plurality of kinds of elements selected from the group consisting of Fe, Ni, Co, Ru, Rh, Pd, Os, Ir, Pt, Cu, and Au.

51. (Currently Amended) A method according to claim 35, wherein the rare gas element is one kind or a plurality of kinds of elements selected from the group consisting of He, Ne, Ar, Kr, and Xe.

52. (New) The method according to claim 1 wherein said semiconductor device is selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, digital camera, a projector, a mobile phone, a portable book, and a display.

53. (New) The method according to claim 18 wherein said semiconductor device is selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, digital camera, a projector, a mobile phone, a portable book, and a display.

54. (New) The method according to claim 35 wherein said semiconductor device is selected from the group consisting of a personal computer, a video camera, a mobile computer, a goggle type display, a player using a recording medium, digital camera, a projector, a mobile phone, a portable book, and a display.

55. (New) A method of manufacturing a semiconductor device, comprising the steps of:

providing a semiconductor film comprising amorphous silicon with a material for promoting crystallization of silicon, said material comprising a metal element;

crystallizing the semiconductor film by heating the semiconductor film after providing said material for promoting crystallization;

selectively adding a rare gas element to a selected region of the crystallized semiconductor film;

gettering the metal element to the selected region to remove or reduce the metal element in the crystallized semiconductor film; and
removing the selected region after the gettering.

56. (New) The method according to claim 55 wherein said rare gas element is added by ion doping or ion implantation.

57. (New) A method of manufacturing a semiconductor device, comprising the steps of:

providing a semiconductor film comprising amorphous silicon with a material for promoting crystallization of silicon, said material comprising a metal element;

crystallizing the semiconductor film by heating the semiconductor film after providing said material for promoting crystallization;

covering a first portion of the crystallized semiconductor film with a first mask;

selectively adding a rare gas element to a second portion of the crystallized semiconductor film in accordance with said first mask;

heating the crystallized semiconductor film after adding said rare gas element so that the metal element in the first portion of the crystallized semiconductor film moves to the second portion;

covering a selected portion of the first portion of the crystallized semiconductor film with a second mask after said heating; and

removing the second portion and a part of the first portion of the crystallized semiconductor film to form an active layer in accordance with the second mask.

58. (New) The method according to claim 57 wherein said rare gas element is added by ion doping or ion implantation.